
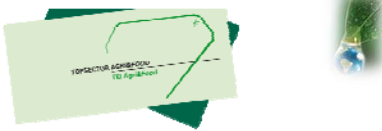


Innovative creators of natural ingredients




Added value of Biotechnology in the Flavour and Fragrances market



ISOBIONICS

Added value of Biotechnology

- **First** company in the world that has succeeded in bringing a natural flavor, "Valencene(80) Pure™", based on a proprietary **fermentation** process to the market
- **Not harvest depending**
 - Higher purity, constant quality & availability
- **No use of scarce natural resources**
- **Natural & healthy**
- **Sustainable, renewable resources**
- **No pesticides**



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Cumbersome conventional production process

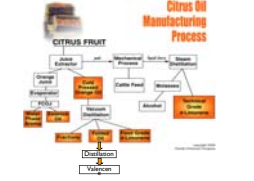

Conventional process
Extraction - Distillation
Starting from Cold Pressed Oil (only ~ 0.5%)

Disadvantages of current approach:

- **Harvest dependent:**
No guaranteed availability
No reliability on quality
- **Inefficient production**
Plagued with pesticides

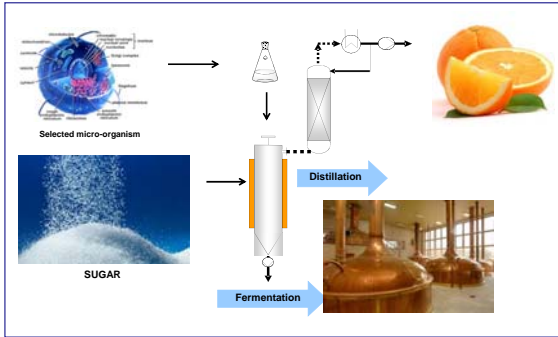
1 kg of Valencene
✓ = ~ 1.6 Million kg of Oranges
✓ = ~ 23.000 Orange trees*

* Instituto de Economia Agrícola 2008/2009 (Sao Paulo)

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Breakthrough technology









ISOBIONICS

Strong organization & partnerships



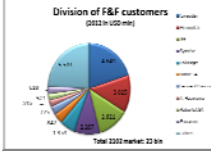
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Isoprenoids: An important group of natural products

Food & nutraceuticals		vitamins A, E, D, K carotenoids, e.g. beta-carotene
Flavors & fragrances		terpenoid aroma chemicals e.g. linalool, citral, L-menthol
Cosmetics		coenzyme Q10
Agrochemicals		chrysanthemic acid pyrethroids
Pharmaceutical ingredients		taxol derivatives steroids anti-cancer, e.g. epothilones
Fuels		diesel & jet fuel
Polymers		biolsoprene

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Large F&F and Agrochemical markets



- F&F is a strongly growing market with a CAGR of 5-6%. Total market value of \$20 billion
- The global agrochemical industry is expected to witness good growth and reach an estimated US \$68.5 billion in 2017 with a CAGR of 5.5% over the next five years
- The industry is searching for **alternative production ways (biotechnology)**, since the natural resources are used at the maximum limit.

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Biotech is seen a strategic solution in F&F

- ✓ Harvest Independent
"Scientists Gather to Discuss Citrus Disease Threat"
Citrus greening leaves fruit safe to eat but attacks a tree's vascular system, reducing fruit size, affecting color and causing fruit to drop before ripening. By Reuters Web, Jan 18 2012 at 2:12 PM



- ✓ Natural instead of synthetic



- ✓ Sustainable technology
 - Environmental foot print
 - Oil prices



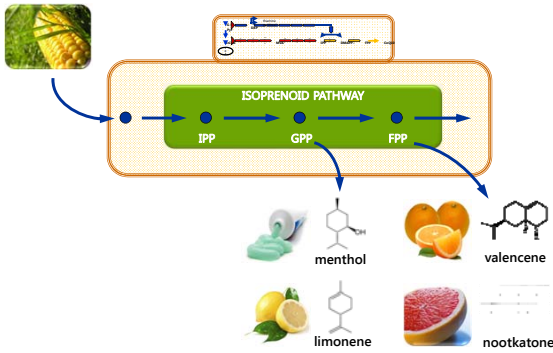
- ✓ Labor intensive production/harvesting
 - Scarce natural resources
 - Labor cost increase ↑

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Double pathway for maximum yield - low cost



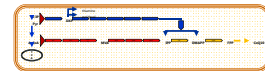
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Competitive edge

- IP/FTO**
 - The only strain (world wide) with a working double pathway
 - Non-yeast production organism
 - There is consensus that yeast in fact already is an IP minefield; many universities patenting.
 - More than 15 patents
- Proven production Strain**
 - Higher cell density
 - Pathway more stable
 - Faster generation time (3x)
- Biotech and Scale-Up experience**
 - Own Biotech, fermentation and F&F labs
 - Access to Biotech (500), Chemistry and Production Engineering (400) capabilities.



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Fermentation up-scaling: from 10L to 160 m3



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Portfolio in flavours

- Valencene 80 (80%)** Highest purity Valencene in the market
- Valencene 75 (75%)** High purity Valencene with organoleptic quality similar to Orange-derived product
- Nootkatone 80 (80%)** Nootkatone with organoleptic quality similar to grapefruit-derived product
- Nootkatone 93 (93%)** Nootkatone compliant to European legislation
- Nootkatone 98 (98%)** Nootkatone for fragrance applications
- Nootkatone 70 (70%)** Nootkatone with with organoleptic quality similar to grapefruit-derived product



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New renewable building block

Beta Elemene Pure™ (98%) High purity Beta Elemene for medicinal use

The diagram shows a central box labeled "beta-Element" with two arrows pointing to the right. The top arrow is labeled "API (medicinal)" and points to a tray of yellow capsules. The bottom arrow is labeled "Flavor and Fragrance" and points to a tray of sliced citrus fruits.

Genus Composites - subject to confidentiality provisions
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Platform technology Flavors & Fragrances → Agro

Platform based on:

- ✓ On renewable resources
- ✓ Sustainable - Environmentally friendly
- ✓ No use of scarce natural resources
- ✓ Not Harvest dependent

The diagram illustrates a platform technology starting from a "Unique Strain" (represented by a globe) which produces "Beta Elemene". From this platform, various natural products are derived: Nootkatone (from grapefruit), Valencene (from orange), Patchouli (from patchouli leaves), Myrcene (from mango), α+β Pinene (from pine), Sandalwood (from sandalwood tree), L-Carvone and Menthol (from caraway), and D-Carvone (from caraway). These products are then used in "Agrochemicals" such as Repellents, Plant growth regulators, and Insecticides.

END